

- 5 power/ground pre-routing. If relative placements are used, rework in order to try various placement scenarios or in case of floorplan change will be minimal.

When all floorplan matrices are installed within the floorplan, all involved cells are pre-placed with the fixed status, which is the highest priority. After all structure placements are installed, the usual place and route procedures are 10 executed. The constraints for the rest of the standard unstructured cells are input into the place and route tools, and are placed using automated procedures, such as timing-driven placement. These procedures may make use of the porosity of the datapath matrices to place the rest of the standard cells.

If favorable to placement criteria, such as timing specification, and if free 15 space is available among structured placement, standard cells can be placed within datapaths. Then routing can be performed to complete the layout.

The present invention provides several advantages over the prior art. The approach described above allows the layout designer to address both timing performance and density. Matrices are not "hard macros"; therefore, they can 20 be any shape that makes sense from a timing point of view. The placer can take advantage of the free space within matrices for improving density. Overall timing-driven placement is improved, since the place and route tool always has a global view of all timing constraints and can optimize the layout of no-fixed cell placements.

25 Although the Detailed Description of the invention has been directed to certain exemplary embodiments, various modifications of these embodiments, as well as alternative embodiments, will be suggested to those skilled in the art. The invention encompasses any modifications or alternative embodiments that fall within the scope of the Claims.